

DISCONTINUOUS GALERKIN AND MIXED FINITE ELEMENT METHODS FOR MODELING BIOT'S CONSOLIDATION MODEL OF PORO-ELASTICITY

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We discuss the modeling of Biot's consolidation model for poro-elasticity in porous media. Here we employ a mixed finite element method for approximating the pore pressure and a discontinuous Galerkin method for approximating displacements. Computational and theoretical error estimates are presented. In particular, numerical experiments indicate that this approach yields flow velocities which are locally conservative and a pore pressure which is non-oscillatory even in low permeability regions. Extensions of geomechanical modeling to multiphase flow are also discussed. This work has been done in collaboration with Xiuli Gai, Ruiji Liu, and Phillip Phillips.